INVESTIGATION
OF
FUEL OIL LEAK
FOR
HEXCEL
LODI, NEW JERSEY

BY

TENECH ENVIRONMENTAL ENGINEERS, INC.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW JERSEY.

REGISTRATION NO. GE 25662

6/27/84
Date

Mark W. Tenney
Mark W. Tenney

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Purpose

The Hexcel Corporation plant located in Lodi, New Jersey has experienced a fuel oil leak from a buried storage tank. An investigation was begun in May 1984. The purpose of this report is to present the findings of this investigation. Included in this report are boring logs, laboratory testing program descriptions and results, soil descriptions, conclusions and recommendations.

Subsurface Exploration Borings

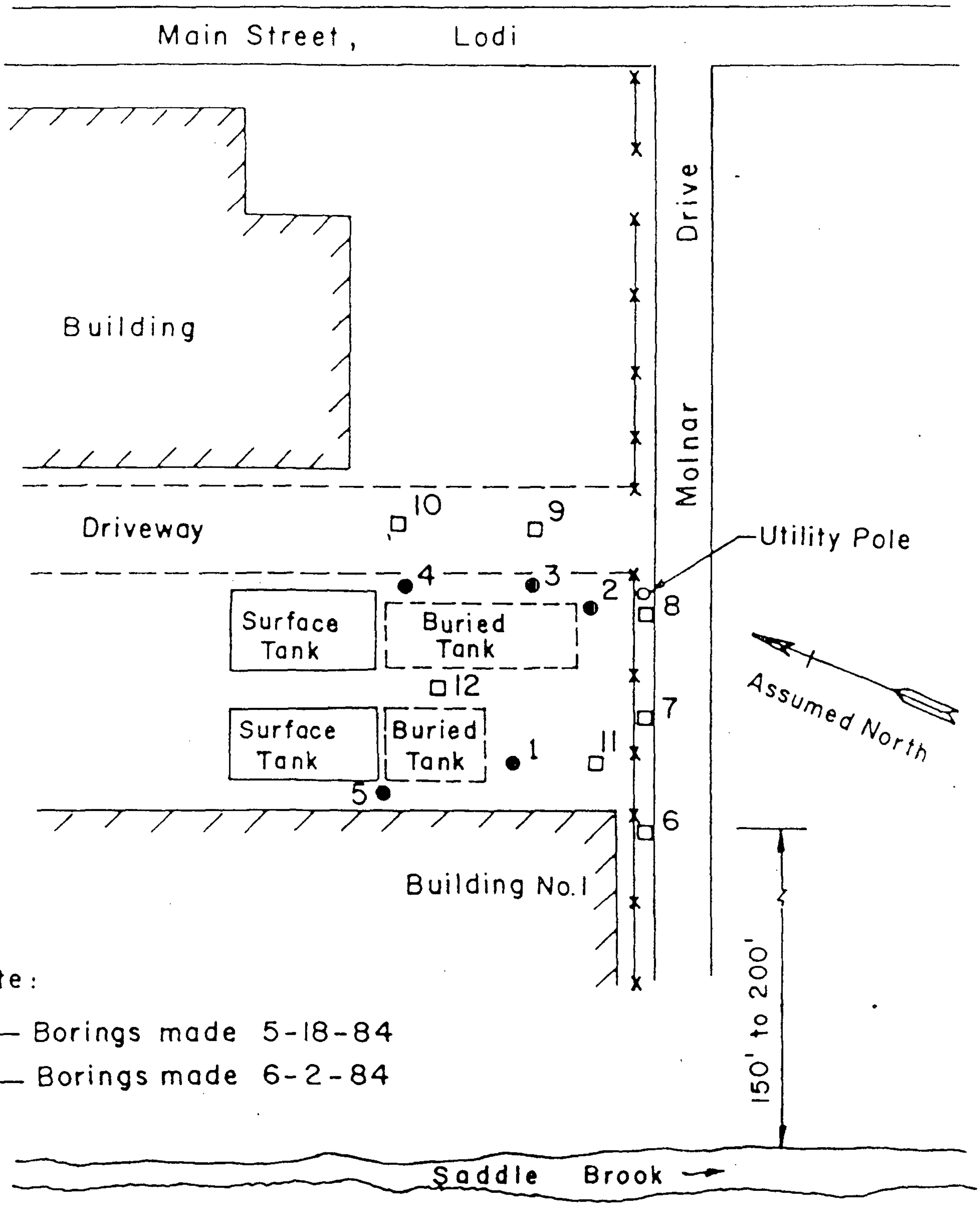
In order to evaluate the lateral and vertical extent of migration of the fuel oil away from the buried tanks, twelve borings were made during May and June of 1984. Locations of the borings are shown on the attached map (Figure No. 1). It would have been desirable to have completely ringed the tanks with borings, but the existing structures, roadways and property boundaries limited possible drill sites. Areas north and west of the tanks could not be accessed.

Drilling to obtain samples was performed by the Warren George Company. All borings were accomplished using a Spreague and Henwood truck-mounted drill rig. Continuous soil samples were obtained utilizing a standard penetration sampler driven with a 140-pound hammer. The sampler was driven for a distance of two feet, then withdrawn and the sample removed. Blow counts for each six-inch increment of depth were recorded in the logs. Materials removed from the sampler were visually inspected and described in the field for purposes of the drill logs. Samples of the materials for laboratory testing were obtained for each depth interval sampled. Material for chemical testing was placed in glass jars and that for physical testing was placed in plastic sample bags.

On May 19, 1984 five borings (B1 through B5) were made in the vicinity of the tanks. Most of the borings were in very close proximity to the tanks, (i.e., within one or two feet of the tanks). Locations of the borings are shown on the attached location map (Figure No. 1). Borings were made on all but the north side of the tanks. Borings B4 and B5 are located on the east and west sides at the north end. Boring logs for the five holes are attached.

On June 2, 1984 seven new borings (B6 through B12) were made along the east and south sides of the tanks. These borings were located approximately ten additional feet away from the tanks. The locations of these new borings can be described as comprising half of a second larger diameter concentric ring around the tanks.

BORING LOCATION MAP



Note:

● — Borings made 5-18-84

□ — Borings made 6-2-84

TenEch Environmental Engineers, Inc., South Bend, Indiana

HEXCEL, Lodi	Scale None	Dr hpa	Ckd
	6-8-84	Figure: 1	

TDS

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Soil Profile

The twelve borings performed identified three relatively consistant soil layers in the area of the tanks. A typical soil profile has been developed from the descriptions in the drill logs. Figure No. 2 is a graphical presentation of that profile. Each of the soil layers can be described as follows:

1. Roadway Surfacing And Concrete The entire area overlaying the tanks is covered by either concrete or roadway surfacing material. Underlaying the surfacing is either gravel or cinders. The combined thickness of these materials ranges from 0.5 to 1.5 feet and averages approximately 1.0 feet in thickness.

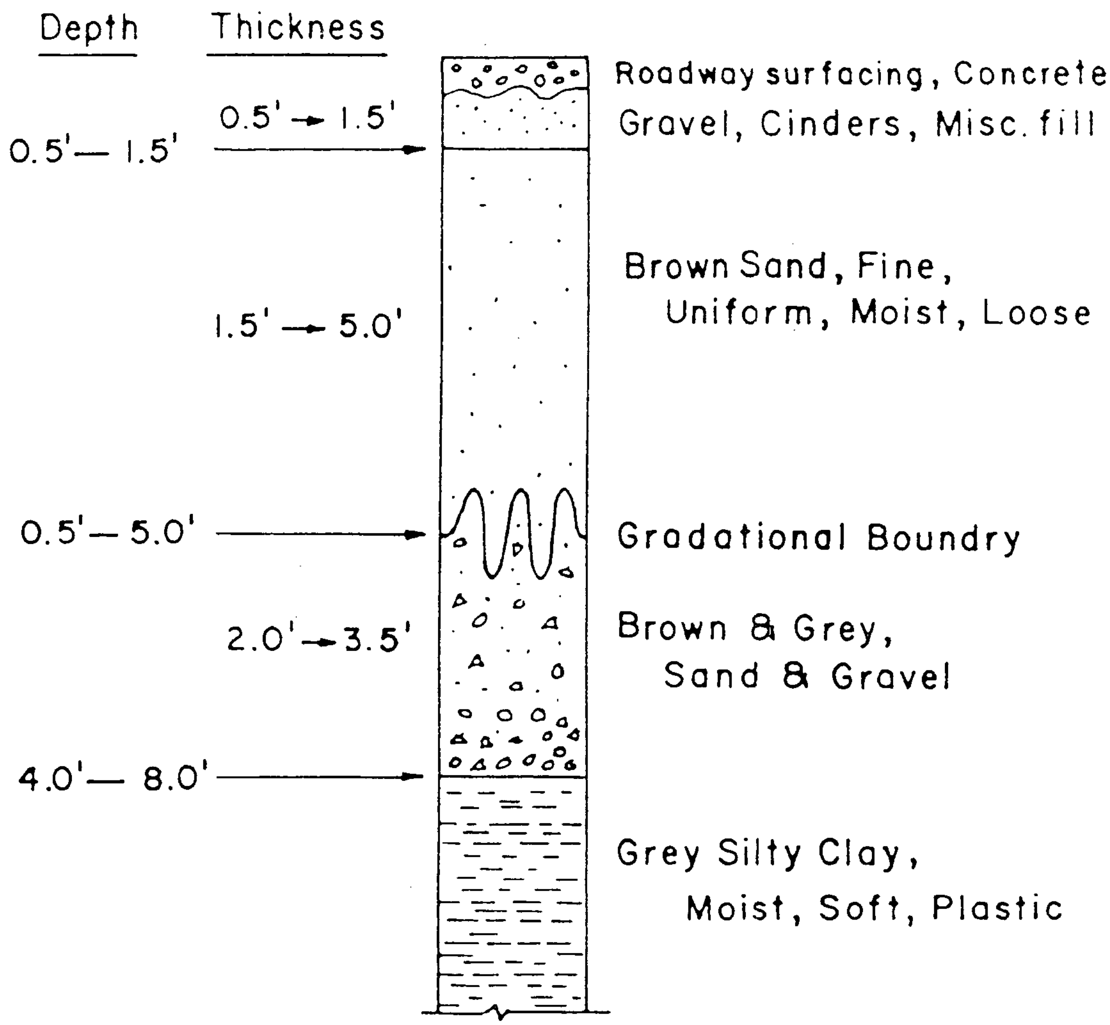
2. Soil Layer #1, Brown Sand The first soil layer consists of brown, relatively uniform sand and silt. This sand is moist and firm, with an average N value of approximately 10. The density of the sand is not uniform as N values ranged from 2 to 28. Thickness of this layer ranges from 1.5 to 5.0 feet.

3. Soil Layer #2, Grey Sand And Gravel Underlaying the brown sand is a grey sand and gravel layer. The size and percentage of gravel appears to increase with depth. It is highly probable that the boundary between the brown and grey sand is gradational. Thickness of this layer ranges from 2.0 to 3.5 feet. An average N value for this layer is 10 with values ranging from 1 to 22.

4. Soil Layer #3, Grey Silty Clay Consistantly and uniformly underlaying the entire area is a silty clay layer. This layer is grey, green and brown in color. Its consistancy is moist and firm. Thickness of this layer is consistantly greater than 1.5 feet. N values in the layer ranged from 3 to 22, with an average value of 10. Some naturally occurring organic materials are present in this layer.

There is a high probability that the upper part of the brown sand layer has been disturbed by past construction activities at the site. The potential also exists that it is a fill material, which had been brought in to level the plant site. It also appears to have been used as the backfill material around the tanks.

TYPICAL SOIL PROFILE



TenEch Environmental Engineers, Inc., South Bend, Indiana

HEXCEL, Lodi	Scale ____	Dr hpa	Ckd
	6-8-84	Figure: 2	

886530006

Physical Testing of Soils

Samples for physical testing of each soil layer were collected from Borings B9, B10, and B11. Material from each boring was composited into one bagged sample for each layer. It was necessary to composit material to obtain an adequate volume of material for testing. Laboratory tests performed on each sample consisted of a gradation analyses performed combining both seives and hydrometer. Atterberg limits were performed to determine the moisture content-consistency relationship for the soils and to allow the soils to be classified using the Unified Soil Classification System. Laboratory testing was performed by Stokley-Cheeks and Associates of Lexington, Kentucky. The laboratory work sheets and results are appended to this report. Laboratory procedures used were Standard ASTM Methods. Methods used were D422 for gram size, D423 for liquid limit, D424 for plastic limit and D2216 for moisture contents.

Table 1 presents a summary of the laboratory test results and Unified Soil Classification for each soil layer. It can be seen in the table that layers #1 and #2 are predominantly sand with significant percentages of both silt and gravel being present. Results also indicate that the soil layer #2 has approximately 20 percent more gravel and sand size particles than soil layer #1. These results indicate a coarsening downward within layers #1 and #2. The Unified Soil Classification for layer #1 of SM indicates that the layer consists of both silt and sand size particles. The classification of SP-SM for layer #2 indicates that gravel, sand and silt size particles comprise the material. Atterberg limits for both layers indicates that the soils are essentially non plastic.

Layer #3 is significantly different from the overlaying sands. It consists of 95 percent silt and clay size particles. The classification CL-ML for the soil indicates that it is a silty clay of low plasticity. Naturally occurring organic materials are present in this layer, but comprise a very small percentage.

Based on the Unified Soil Classifications for the two sand layers, the permeability of the layers could be expected to be within the range of 10^{-3} to 10^{-5} feet/minute. The presence of silt and clay size particles in these layers, depths from 0.5 to 8.0 feet, significantly reduces the potential permeability of these layers. The coarsening downward within the sand layers would result in an increasing permeability with depth. Permeability of the silty clay layer, located at a depth of 8.0 feet and below, could be expected to be on the order of 10^{-7} feet/minute. This layer is essentially impermeable. The sand layers can be considered to be moderately permeable. The values of permeability were taken taken from tables of typical values in Design of Small Dams, by the Bureau of Reclamation and Soil Mechanics, Foundations and Earth Structures Navfac DM 7, by the Naval Facilities Design Command.

TABLE 1

PHYSICAL TEST RESULTS FOR SOIL

LAYER DEPTH	#1 0.5 - 5.0	#2 4.0 - 8.0	#3 8.0 & BELOW
GRAVEL	4%	15%	0%
SAND	58%	76%	5%
SILT	31%	7%	75%
CLAY	7%	2%	20%
LIQUID LIMIT	26	28	21
PLASTIC LIMIT	25	27	17
PLASTIC INDEX	1	1	4
UNIFIED SOIL CLASSIFICATION	SM	SP-SM	CL-ML

Occurance of Oil

The objective of the exploration program was to locate and determine the extent of movement of fuel oil in the ground surrounding the tanks. For the twelve borings made, signs of oil were visually observed in nine of the borings. There was no oil visually observed in borings B3, B5 and B6. At a later date oil was observed on the water in B3.

The amount of oil occuring in the samples varied between the borings. For borings in close proximity to the tanks, oil could visually be seen in the samples. For the outer ring of borings, the amount of oil observed was less. This fact was established based on the driller's observations and comments during personal discussions with him. The presence of oil consisted of a sheen on the sample or on water in the sampler. It is also substantiated by visual inspection and comparisons of the samples.

The occurance of oil was principally within the grey sand and gravel layer. Within that layer, the oil appeared to be greater near the bottom. This would tend to be expected as the layer is coarser toward the bottom and permeability is higher. Some trace amounts of oil were observed within the brown sand layer.

Significant conclusions which can be drawn follow:

- Oil has leaked from the tank and is principally present in the grey sand and gravel layer, and backfill surrounding the tank.

- The amount of oil present in the decreases with distance from the tank.

- The permeability of the sand and gravel layers, depths ranging from 0.5 to 8.0 feet, is moderate and the oil could have moved some limited distance through the layers.

Oil Content Testing

For the purposes of determining oil content of the soil surrounding the tanks, samples were tested from three borings. Samples covering the entire thickness of layers #1, and #2 and the top of layer #3 were tested from borings B6, B8 and B10. The oil and grease content was determined using the standard method given in "Procedures For Handling and Chemical Analysis of Sediment and Water Samples," (EPA/CE-81-1), May, 1981. The exact method used was; Oil and Grease Method 1, Freon Extraction, page 3-284. This method reports the free and extractable oil and grease content of a material on a dry weight basis. Results are reported in units of mg/Kg or parts per million. Laboratory testing was conducted by Aqualab, Inc. of Streamwood, Illinois. The laboratory report is appended to this report.

Table 2 presents a summary of the laboratory test results for the oil and grease content testing. Reported in the table is the oil content in parts per million and also in percentage by dry weight. Within the sand layers, the oil contents range from 1,250 to 10,100 parts per million. Within the silty-clay layers, the oil contents range from 149 to 650 parts per million. On review of the results in the table, it can be seen that the last sample in each boring has a significantly lower oil and grease content than those at shallower depths. The last sample in each boring is from the third soil layer, the silty-clay. Within the sand layers the oil content averaged 0.48 percent. Within the silty clay layer, the oil content averaged 0.03 percent. It is highly probable that the 0.03 percent value is a natural background amount due to the naturally occurring organics present in the soil.

Based upon a review of the New Jersey Hazardous Waste Regulations, it would appear that none of the soil samples tested would be representative of a hazardous waste. The New Jersey regulations (Revision 84-1) define New Jersey Hazardous Waste Number X725 as follows:

> Oil spill cleanup residue which: A) is contaminated beyond saturation; or B) the generator fails to demonstrate that the spilled material was not one of the listed hazardous waste oils, (see page 8-14a of the New Jersey Hazardous Waste Regulations).

Fuel oil, when stored and used for its original purpose, is not a hazardous waste under the regulations, so only Part A must be addressed. The soil samples collected at the Lodi facility all contained 1.01 percent oil or less. None of the samples were found to be saturated with oil and, therefore, should not be considered hazardous wastes.

TABLE 2

SAMPLE OIL CONTENT

BORING NO.	DEPTH (FT)	SAMPLE NO.	OIL CONTENT PPM (Mg/Kg)	PERCENT OIL CONTENT
B6	1.0 - 3.0	8000	1250	0.13%
	3.0 - 5.0	8001	3880	0.39%
	5.0 - 7.0	8002	3610	0.36%
	7.0 - 8.0	8003	4000	0.40%
	9.5 -10.5	8004	149	0.01%
B8	2.5 - 5.5	8009	7950	0.80%
	5.5 - 7.0	8010	6070	0.61%
	8.0 - 9.0	8011	650	0.07%
B10	3.0 - 5.0	8013	10100	1.01%
	5.0 - 7.0	8014	3890	0.39%
	7.0 - 8.0	8015	2280	0.23%
	9.5 -11.0	8016	174	0.02%

Ground Water Levels

The occurance of ground water was noted in all the borings. Water levels in all the borings was measured on June 2, 1984. The depth below the existing ground surface to the water level in the holes ranged from 4.0 to 4.5 feet. Several of the holes had caved in at that depth and a wet sand slurry was present below that depth.

It should be noted that ground water levels may have been abnormally high at the time the meaurements were made due to the unusually heavy rains which had occured.

Factors controlling ground water movement and ground water levels in the area are as follows:

- Saddle Brook river located approximately 150 to 200 feet west of the tanks is the hydrostatic low in the immediate area of the tanks. Flow of ground water in the sand layers could be expected to be toward the river.

- The location and elevation of the silty clay layer has pearched the water table and prevented vertical movement of water and oil through the layer.

- The permeability of the sand layer is moderate, 10^{-3} to 10^{-5} feet/minute. Estimating that the Saddle Brook river is located 5 feet lower in elevation than the water table in the borings, the maximum flow velocity twoard the river would be 0.05 feet per day based on the following calculation (with an assumed permeability of 10^{-3} feet/minute:

$$V = ki$$
$$V = (1 \times 10^{-3}\ \text{ft/min})\ \frac{5\ \text{ft}}{150\ \text{ft}} \times 1440\ \frac{\text{min}}{\text{day}}$$
$$V = 0.05\ \text{ft/day}$$

If the permeability is 10^{-5} feet/minute, the flow rate would be 0.0005 feet/day. These calculations indicate that the movement of ground water toward the Saddle Brook river is at a slow to moderate rate.

Conclusions

Conclusions which can be drawn based on the information which is available are as follow:

- Fuel oil is present in the sandy soils immediately surrounding the buried tanks. The vertical extent of oil contaminated soil is limited because of the presence of the silty clay layer.

- The amount of oil present in the sand and gravel layers, depths ranging from 0.5 to 8.0 feet, decreases with distance from the tanks. This fact is supported by both visual observations and laboratory test results. The moderate permeabilities of the sands has limited the lateral migration of the oil.

- The silty clay layer has not been contaminated by the fuel oil. Visual observations and laboratory test results support this fact.

- Soils located at a distance of 10 feet or greater from the tanks have oil contents equal to or less than 1.01 percent based on their dry weight.

- Thickness of the sand and gravel layer ranges from four to eight feet. Flow of water in this layer would be expected to be toward the Saddle Brook river, located to the south-west of the buried tanks. If additional sampling or drilling is desired, to check the downgradient conditions in more detail, this could be conducted in the vicinity of borings Number 1 and 11.

STOKLEY-CHEEKS AND ASSOCIATES, INC.

GEOTECHNICAL ENGINEERS & GEOLOGISTS

ESTABLISHED 1956

2520 REGENCY ROAD, SUITE 106, LEXINGTON, KENTUCKY 40503

TELEPHONE (606) 278-3402

SUMMARY OF LABORATORY TEST DATA

BORING NO.	SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	SOIL CLASSIFICATION	NATURAL WATER CONTENT, %	WET UNIT WT., PCF	DRY UNIT WT., PCF	SPECIFIC GRAVITY	GRAIN SIZE: GRAVEL, %	GRAIN SIZE: SAND, %	GRAIN SIZE: FINES (SILT & CLAY) %	GRAIN SIZE: SILT, %	GRAIN SIZE: CLAY, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONFINED STRENGTH, KSF	Ø, DEGREES	COHESION, PSF	MAX. DRY DENSITY	OPTIMUM MOISTURE CONTENT, %	COMPRESSION INDEX	CBR	
Bag	1	Bag	Bag	SM				2.66 Assumed	4	58	38	31	7	26	25	1								
Bag	2	Bag	Bag	SP-SM				2.66 Assumed	15	76	9	7	2	28	27	1								
Bag	3	Bag	Bag	CL-ML				2.68 Assumed	0	5	95	75	20	21	17	4								

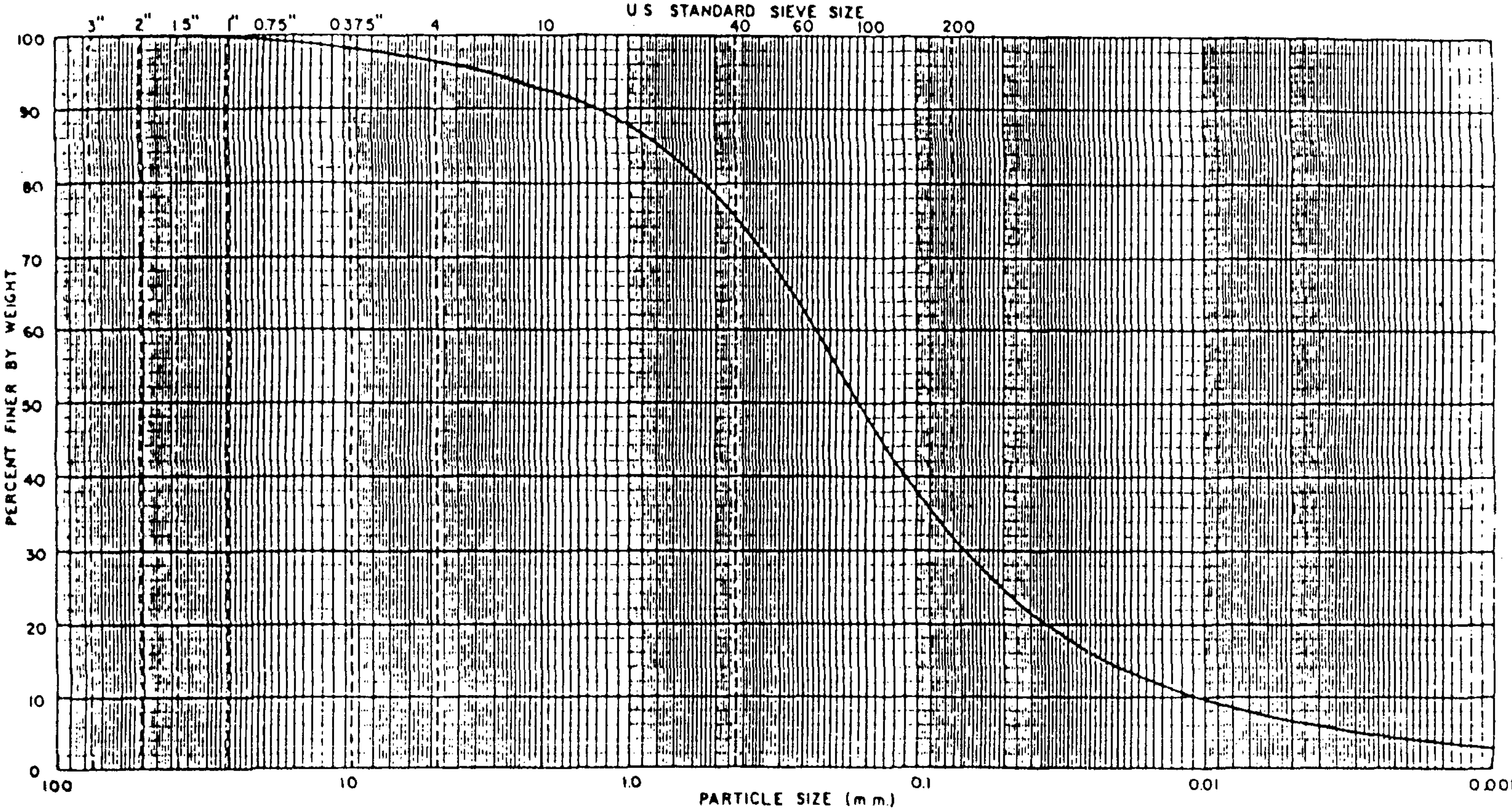
SC-682

Ten-Ech Testing

SHEET 1 OF 1

Bler-201

PARTICLE - SIZE ANALYSIS OF SOILS (ASTM D-422)



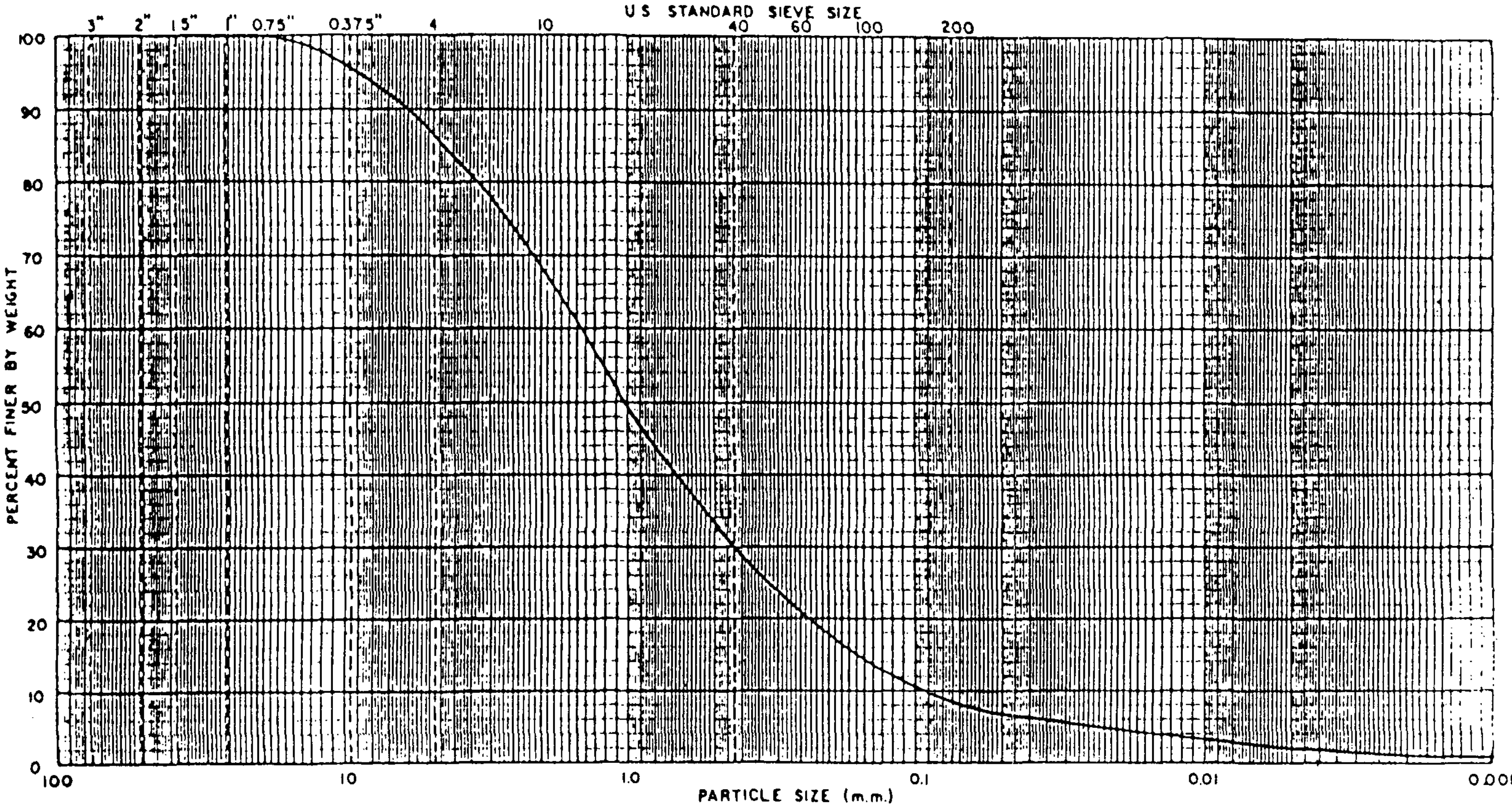
COBBLES (+3") 0 %
GRAVEL (-3", +NO. 4) 4 %
SAND (-NO. 4, +NO. 200) 58 %
a. COARSE SAND (-NO. 4, +NO. 10) 3 %
b. MEDIUM SAND (-NO. 10, +NO. 40) 13 %
c. FINE SAND (-NO. 40, +NO. 200) 42 %
SILT (-NO. 200, +.005 m.m.) 31 %
CLAY (-.005 m.m.) 7 %
COLLOIDS (-.001 m.m.) 3 %

MAXIMUM SIZE OF PARTICLES 3/4"
DESCRIPTION OF SAND & GRAVEL N/A
SHAPE (ROUNDED OR ANGULAR) N/A
HARDNESS N/A
SPECIFIC GRAVITY 2.66 Assumed
REMARKS

JOB NAME Ten-Ech
JOB LOCATION N/A
JOB NO. SC-682
SAMPLE DATA: BORING NO. Bag
SAMPLE NO. 1
DEPTH (FT.) -
SOIL DESCRIPTION Light Brown, Silty Sand

STOKLEY-CHEEKS & ASSOCIATES, INC.

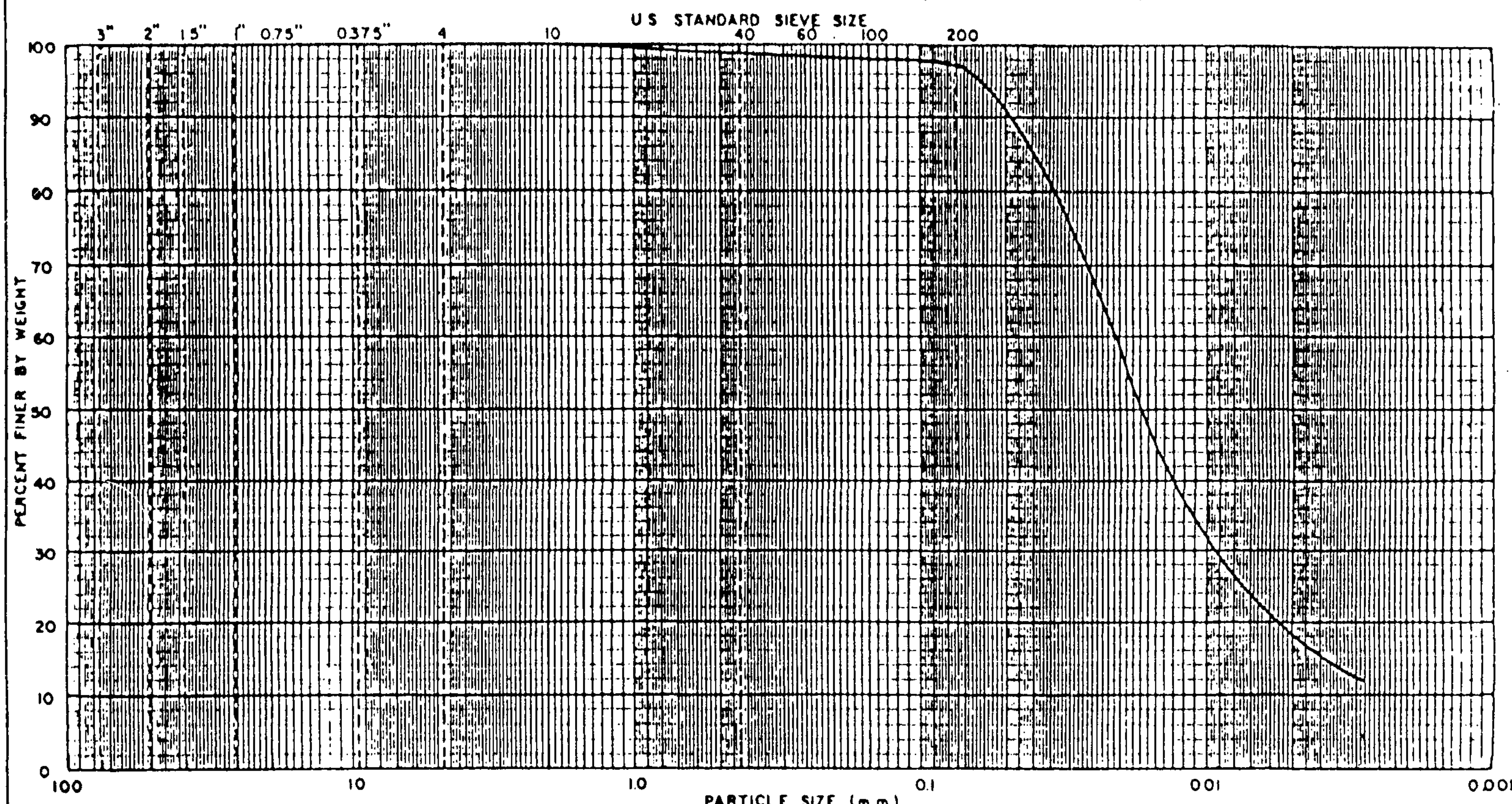
PARTICLE - SIZE ANALYSIS OF SOILS (ASTM D-422)



COBBLES (+3")	0 %	MAXIMUM SIZE OF PARTICLES	3/8"	JOB NAME	Ten-Ech
GRAVEL (-3", +NO. 4)	15 %	DESCRIPTION OF SAND & GRAVEL	N/A		
SAND (-NO. 4, +NO. 200)	76 %			JOB LOCATION	N/A
a. COARSE SAND (-NO. 4, +NO. 10)	21 %	SHAPE (ROUNDED OR ANGULAR)	N/A	JOB NO.	SC-682
b. MEDIUM SAND (-NO. 10, +NO. 40)	32 %	HARDNESS	N/A	SAMPLE DATA: BORING NO.	Bag
c. FINE SAND (-NO. 40, +NO. 200)	23 %	SPECIFIC GRAVITY	2.66 Assumed	SAMPLE NO.	2
SILT (-NO. 200, +.005 m.m.)	7 %	REMARKS		DEPTH (FT.)	-
CLAY (-.005 m.m.)	2 %			SOIL DESCRIPTION	Light Brown, Silty Sand, Poorly Graded
COLLOIDS (-.001 m.m.)	1 %				

STOKLEY-CHEEKS & ASSOCIATES, INC.

PARTICLE - SIZE ANALYSIS OF SOILS (ASTM D-422)



COBBLES (+3")	0 %
GRAVEL (-3", +NO. 4)	0 %
SAND (-NO. 4, +NO. 200)	5 %
a. COARSE SAND (-NO. 4, +NO. 10)	0 %
b. MEDIUM SAND (-NO. 10, +NO. 40)	1 %
c. FINE SAND (-NO. 40, +NO. 200)	4 %
SILT (-NO. 200, +.005 m.m.)	75 %
CLAY (-.005 m.m.)	20 %
COLLOIDS (-.001 m.m.)	6 %

MAXIMUM SIZE OF PARTICLES #4
DESCRIPTION OF SAND & GRAVEL N/A

SHAPE (ROUNDED OR ANGULAR) N/A
HARDNESS N/A
SPECIFIC GRAVITY 2.68 Assumed
REMARKS

JOB NAME Ten-Ech

JOB LOCATION N/A
JOB NO. SC-682
SAMPLE DATA: BORING NO. Bag
SAMPLE NO. 3
DEPTH (FT.) -
SOIL DESCRIPTION Light Brown Silt and Lean Clay

STOKLEY-CHEEKS & ASSOCIATES, INC.

886530017

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
ASTM Designation: D 2487 - 83
(Based on Unified Soil Classification System)

SOIL ENGINEERING

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification: Group Symbol	Soil Classification: Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$[E]	GW	Well graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3$[E]	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$[E]	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3$[E]	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OL	Organic clay[K,L,M,N] Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OH	Organic clay[K,L,M,P] Organic silt[K,L,M,Q]
Highly organic soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols:
- GW-GM well-graded gravel with silt
- GW-GC well-graded gravel with clay
- GP-GM poorly graded gravel with silt
- GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
- SW-SM well-graded sand with silt
- SW-SC well-graded sand with clay
- SP-SM poorly graded sand with silt
- SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥30% plus No. 200, predominantly sand, add "sandy" to group name.

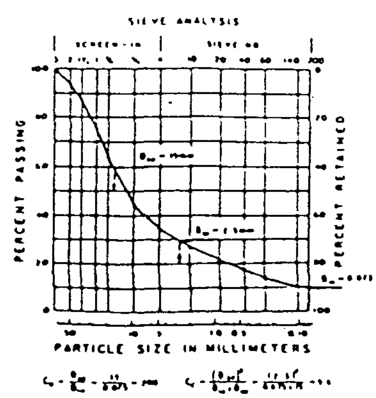
[M] If soil contains ≥30% plus No. 200, predominantly gravel, add "gravelly" to group name.

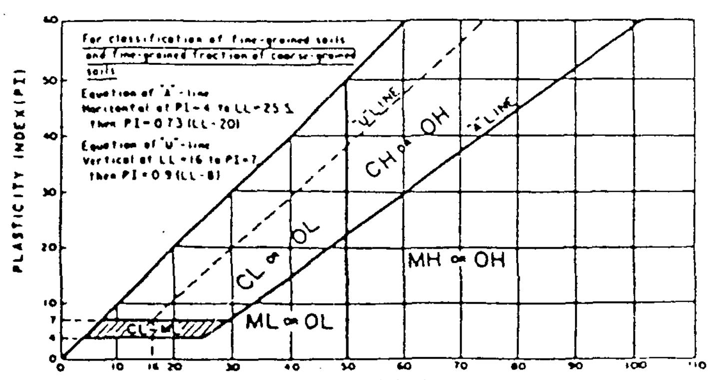
[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.





886530018

JOB LOCATION	WARREN GEORGE, INC.	SHEET 1 OF 1
205 Main St.	FOOT OF JERSEY AVENUE	LOCATION Lodi, N. J.
Lodi, N. J.	P. O. BOX 413	HOLE NO. E-2
	JERSEY CITY, N.J. 07303	LINE & STA.
	FOR: Hexcel Corporation	OFFSET

DEPTH 53" FT. ___ FT. CASING OUT DATE: ___ DATE, START: 5/18/84 GROUND ELEVATION ___

DEPTH ___ FT. ALL CASING OUT DATE: ___ DATE, FINISH: ___ GROUND WATER ELEVATION ___

CASING O.D. ___ I.D. ___ WEIGHT OF HAMMER 300-140 LBS. HAMMER FALL

SAMPLER O.D. ___ I.D. ___ INSIDE LENGTH OF SAMPLER ___ IN. CASING 24 SAMPLER 30

DIAMOND BIT SIZE 2

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6 / 6-12 / 12-18	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
0							0'-1'	Cinders Fill
		1	0-2'		4-3-4-2			Brown Medium Fine Sand Fine Gravel
		2	2'-4'		1-1-3-4		1'4'	Medium Sand, Medium Coarse Gravel, Silty
		3	4'6'		3-4-4-6		4'7'	
		4	6'-8'	A	7-4-6-7- OTT		7'9'	Brown Fine Silty Clay
		4		B	1-4-6-7			
10		5	8'-10'		5-4-5-13		9'10'	Brown Fine Silty Sand
20								
30								
40								

Soils Engineer: ___ Driller: George Kutchera

Drilling Inspector: ___ Helper: Frank Jones

886530019

JOB LOCATION	WARREN GEORGE, INC.	SHEET 1 OF 1
205 Main St	FOOT OF JERSEY AVENUE	LOCATION Main St, Lodi
Lodi N.J.	P. O. BOX 413	HOLE NO. B-1
	JERSEY CITY, N.J. 07303	LINE & STA.
	FOR: Hexcel Corporation	OFFSET

DEPTH 54" FT. ___ FT. CASING OUT DATE:	DATE, START: 5/18/84	GROUND ELEVATION
DEPTH ___ FT. ALL CASING OUT DATE:	DATE, FINISH:	GROUND WATER ELEVATION

CASING O.D. ___ I.D. ___	WEIGHT OF HAMMER 300-140 LBS.	HAMMER FALL
SAMPLER O.D. ___ I.D. ___		
DIAMOND BIT SIZE 2	INSIDE LENGTH OF SAMPLER ___ IN.	CASING 24 SAMPLER 30

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6 6-12 12-18	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
0							0'6"	Concrete
		1	0-2'		1-2-7-3		6'1"	Cinders Fill
		2	2'-4'		3-3-1-2		1'5'	Brown Fine Silt, Sand
		3	4'-6'		1-0-1-5		5'6'	Gray Brown Medium Coarse Sand
		4	6'-8'	A	10-5-4-5	Oil		Medium Gravel - Oils
				B	10-5-4-5			
		5	8'-10'		1-1-2-4		6'10'	Brown Fine Silt, Sand Little Clay
10								
20								
30								
40								

Soils Engineer:	Driller: George Kutschera
Drilling Inspector:	Helper: Frank Jones

886530020

JOB LOCATION:	WARREN GEORGE, INC.	SHEET 1 OF 1
205 Main Street	FOOT OF JERSEY AVENUE	LOCATION Lodi, N. J.
Lodi, N. J.	P. O. BOX 413	HOLE NO. # 3
	JERSEY CITY, N.J. 07303	LINE & STA.
	FOR: Hexcel Corporation	OFFSET

DEPTH 54' FT. ___ FT. CASING OUT DATE:	DATE, START: 5/18/84	GROUND ELEVATION
DEPTH ___ FT. ALL CASING OUT DATE:	DATE, FINISH:	GROUND WATER ELEVATION

CASING O.D. ___ I.D. ___	WEIGHT OF HAMMER 300-140 LBS.	HAMMER FALL
SAMPLER O.D. ___ I.D. ___	INSIDE LENGTH OF SAMPLER ___ IN.	CASING 24 SAMPLER 30
DIAMOND BIT SIZE		

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6 / 6-12 / 12-18	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
0							0'6"	Concrete
							6" 1'	Cinders Fill
		1	0'2'		4-5-2-2			
		2	2'-4'		1-1-2-3			Brown Fine Medium Sand Little Silt
		3	4'-6'		3-6-6-7		1'7'6"	
		4	6'-8'		6-9-7-6		7'6"3'	Brown Silt Little Clay
		5	8'-10'		6-6-7-11		9'10'	Brown Silt, Clay
10								
20								
30								
40								

Soils Engineer: ______ Driller: George Kutchera

Drilling Inspector: ______ Helper: Frank Jones

886530021

JOB LOCATION.

205 ~~Main~~ Street

Lodi, N. J.

WARREN GEORGE, INC.

FOOT OF JERSEY AVENUE
P. O. BOX 413
JERSEY CITY, N.J. 07303

FOR: Hexcel Corporation

SHEET 1 OF 1
LOCATION Lodi, N.
HOLE NO. # 4
LINE & STA.
OFFSET

DEPTH 54" FT. ___ FT. CASING OUT DATE:
DEPTH ___ FT. ALL CASING OUT DATE:

DATE, START: 5/18/84
DATE, FINISH:

GROUND ELEVATION
GROUND WATER ELEVATION

CASING O.D. ___ I.D. ___
SAMPLER O.D. ___ I.D. ___
DIAMOND BIT SIZE 2

WEIGHT OF HAMMER 300 -140 LBS.
INSIDE LENGTH OF SAMPLER ___ IN.

HAMMER FALL
CASING 24 SAMPLER 30

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER (0-6 / 6-12 / 12-18)	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
0							0-6	Concrete
		1	0-2'		7-7-5-5		6" 2'	Brown Fine Sand
		2	2'-4'		4-5-5-7		2'5'6"	Grayish Brown Fine Coarse Sand
		3	4'-6'		6-6-9-9		5'6" 7'6"	Gray Coarse Sand Silty
		4	6'-8'	A	4-5-4-6 Oil			
		5	8'-10'	B	4-5-4-6 7-8-11-12		7'6"10'	Gray Silty Clay Varred On Lenses
10								
20								
30								
40								

Soils Engineer:
Driller: George Kutchera
Drilling Inspector:
Helper: Frank Jones

886530022

JOB LOCATION	WARREN GEORGE, INC.	SHEET 1 OF 1
205 Main Street	FOOT OF JERSEY AVENUE	LOCATION Lodi, N. J.
Lodi, N. J.	P. O. BOX 413	HOLE NO. E-5
	JERSEY CITY, N.J. 07303	LINE & STA.
	FOR: Hexcel Corp.	OFFSET

DEPTH 60" FT. ___ FT. CASING OUT DATE:	DATE, START: 5/18/84	GROUND ELEVATION
DEPTH ___ FT. ALL CASING OUT DATE:	DATE, FINISH:	GROUND WATER ELEVATION

CASING O.D. ___ I.D. ___	WEIGHT OF HAMMER 300-140 LBS.	HAMMER FALL
SAMPLER O.D. ___ I.D. ___	INSIDE LENGTH OF SAMPLER ___ IN.	CASING 24 SAMPLER 30
DIAMOND BIT SIZE 2		

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6 / 6-12 / 12-18	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
0							0"-6"	Concrete
							6"1'	Cinders Fill
		1	0-2'		1-1-1-1		1'4'	Red Brown Sand And Sandstone Fragments Possible Fill
		2	2'-4'		5-5-4-6			
		3	4'-6'		3-4-4-5		4'5'8"	Gra. Brown Coarse Medium Sand
		4	6'-8'		3-4-5-5		5'8" 7'	Gra. Silt Little Sand
		5	8'-10'		3-4-5-7		7'10'	Gra. Silt, Sand, Trace Of Clay
10								
20								
30								
40								

Soils Engineer: ______ Driller: George Kitchers

Drilling Inspector: ______ Helper: Frank Jones

886530023

TEST BORING RECORD

Driller Warren George, Inc (G. Kutschera) Project No. Hexcel Corporation, Lodi

Ground Water Elev ______ Consultant ______

Date Started 6-2-84 Date Completed 6-2-84 Station No. ______

Size Casing — Total — ft. Hole No. B6 Surface Elev. —

Sample Size ______ Sheet 1 of 1 Sheets

Total No. Core Boxes — Sample Hammer Wt 140 # Lbs.; Drop 30 Ins.

Size Core — Size Auger ______

ELEVATION	DEPTH	CLASSIFICATION OF MATERIAL	BLOWS & TIME	SAMPLE NO. & RUN	CORE RECOVERY	CORE LOSS	REMARKS
	1.0	Road surfacing and gravel		7999			
	3.0	Redish Brown Sand Moist, Firm	9/9/9/7	8000			
	5.0		5/9/10/21	8001			4.0' Water Leve[l]
	6.0		14/12/10/9	8002			
	7.0	Redish Brown And Grey Sand, Wet, Course Sand and Gravel Near Botton of Layer					Possible Sho[w] of Oil, Odor
	8.0	Grey Silty Clay Varved, Firm, Moist Plastic	8/10/10/9	8003			
	9.0						
	11.0		7/9/13/14	8004			
		Stopped Hole 11.0'					

886530024

TEST BORING RECORD

Driller Warren George, Inc. (G. Kutschera)

Project No. Hexcel Corporation, Lodi

Ground Water Elev

Consultant

Date Started 6-2-84 Date Completed 6-2-84

Station No.

Size Casing — Total — ft.

Hole No. B7 Surface Elev.

Sample Size

Sheet 1 of 1 Sheets

Total No. Core Boxes —

Sample Hammer Wt. 140 # Lbs. Drop 30 " Ins

Size Core —

Size Auger

ELEVATION	DEPTH	CLASSIFICATION OF MATERIAL	BLOWS & TIME	SAMPLE NO. & RUN	CORE RECOVERY	CORE LOSS	REMARKS
		Road Surfacing, Gravel Cinders, Fill, Misc.					Sample Not Tak[en]
	1.5	Brown Silty Sand Uniform, Loose, Moist	6/5/5/2	8005			
	3.5						
		Redish Brown And Grey Sand, Course Sand And Gravel At Bottom of Layer Wet, Loose	1/1/2/1	8006			4.2' Water Leve[l]
	5.5		2/3/5/6	8007			Show of Oil
	7.0	Grey And Green Silty Clay Varved, Moist, Plastic					
	7.5		1/2/5/6	8008			
	9.5	Stopped Hole 9.5'					

886530025

TEST BORING RECORD

Driller Warren George, Inc. (G. Kutchera)

Project No. Hexcel Corporation, Lodi

Ground Water Elev. ______

Consultant ______

Date Started 6-2-84 Date Completed 6-2-84

Station No. ______

Size Casing — Total — ft.

Hole No. B 8 Surface Elev. ______

Sample Size ______

Sheet 1 of 1 Sheets

Total No. Core Boxes —

Sample Hammer Wt. 140 # Lbs.: Drop 30" Ins.

Size Core —

Size Auger ______

ELEVATION	DEPTH	CLASSIFICATION OF MATERIAL	BLOWS & TIME	SAMPLE NO. & RUN	CORE RECOVERY	CORE LOSS	REMARKS
		Roadway Surfacing, Gravel, Cinders, Fill Very Firm	18/19/7				Sample Not Taken
	1.5		5/7/9/11				No Sample Recovere
	3.5	Brown, Grey & Black Sand and Gravel Loose, Wet	5/5/4/4	8009			Odor of Oil 4.5' Water Level
	5.5		5/5/8/10	8010			Oil In Gravel
	7.0	Grey, Green & Brown Silty Clay Firm, Moist, Plastic					
	7.5		7/10/12/15	8011			
	9.5	Stopped Hole 9.5					

886530026

TEST BORING RECORD

Driller Warren George, Inc. (G. Kutschera) Project No. Hexcel Corporation, Lodi

Ground Water Elev. ______ Consultant ______

Date Started 6-2-84 Date Completed 6-2-84 Station No. ______

Size Casing ______ Total ______ ft. Hole No. B9 Surface Elev. ______

Sample Size — Sheet 1 of 1 Sheets

Total No. Core Boxes — Sample Hammer Wt. ______ Lbs.; Drop ______ Ins

Size Core — Size Auger ______

ELEVATION	DEPTH	CLASSIFICATION OF MATERIAL	BLOWS & TIME	SAMPLE NO. & RUN	CORE RECOVERY	CORE LOSS	REMARKS
		Concrete & Gravel					Sample Not Take
	0.5	Brown Sand, Frim, Moist, Some Small Gravel	7/5/6/7	8020			
	2.5		12/14/14/12	8021			Some [illegible] on water in samp ← Water Leve
	4.5	Grey Sand And Gravel, Firm, Wet	7/10/8/8	8022			Show of Oil In Sample
	6.5		7/4/5/4	8023			
	8.0	Redish Brown & Grey Silty Clay Moist, Soft, Plastic					
	8.5		2/2/6/6	8024			
	10.5	Stopped Hole 10.5'					

886530027

TEST BORING RECORD

Driller: Warren George, Inc. (G. Kutchera)
Project No.: Hexcel Corporation, Lodi
Ground Water Elev.: ____
Consultant: ____
Date Started: 6-2-84 Date Completed: 6-2-84
Station No.: ____
Size Casing: ____ Total: ____ ft.
Hole No.: B10 Surface Elev.: ____
Sample Size: ____
Sheet 1 of 1 Sheets
Total No. Core Boxes: ____
Sample Hammer Wt.: 140 # Lbs.; Drop 30" Ins.
Size Core: ____
Size Auger: ____

ELEVATION	DEPTH	CLASSIFICATION OF MATERIAL	BLOWS & TIME	SAMPLE NO. & RUN	CORE RECOVERY	CORE LOSS	REMARKS
		Concrete					Samples Not Taken.
	0.5	Gravel					
	1.0	Brown Sand Moist, Loose	7/6/5/4	8012			
	3.0		2/2/2/1	8013			4.4' Water Level
	5.0	Brown & Grey Sand & Gravel Wet, Loose	1/2/1/1	8014			
	7.0		2/5/5/5	8015			Show of Col[illegible] water in Sampl[illegible]
	7.5	Redish Brown Silty Clay Loam Moist, Firm, Plastic					
	8.0						
	9.0		4/5/5/5	8016			
	11.0	Stopped Hole 11.0'					

886530028

TEST BORING RECORD

Driller Warren George, Inc. (G. kutchera) Project No. Hexcel Corporation, Lodi

Ground Water Elev. ____ Consultant ____

Date Started 6-2-84 Date Completed 6-2-84 Station No. ____

Size Casing — Total — ft. Hole No. B 11 Surface Elev. ____

Sample Size ____ Sheet 1 of 1 Sheets

Total No. Core Boxes — Sample Hammer Wt. 140 # Lbs., Drop 30" Ins.

Size Core — Size Auger ____

ELEVATION	DEPTH	CLASSIFICATION OF MATERIAL	BLOWS & TIME	SAMPLE NO. & RUN	CORE RECOVERY	CORE LOSS	REMARKS
		Concrete					
	0.5	Gravel & Cinders					Samples Not Tak
	1.0	Brown Sand Moist, Firm	3/6/3	Bag			
	2.5	Becomes Loose & wet Below 2.5'	2/1/1/1	Bag			Slight Show of C On Water In Sam
	4.5						← Water Leve
		Grey Sand + Gravel, Loose, wet	0/1/0/6	Bag			Oil In Bottom o Sampler
	6.5						Oil In Grave
	7.5	Redish Brown & Grey Silty Clay Loam Moist, Firm, Plastic	4/4/3/5	Bag			
	8.5		3/4/5/7	Bag			
	9.5	Stopped Hole 9.5'					

886530029

15 June 1984

analytical report 56694-16

. TENECH ENVIRONMENTAL ENGINEERS
744 W. Washington
South Bend, IN 46601

Attn: Mr. Charles Bishop

SAMPLE DESCRIPTION: "Hexcel"

date taken | date received 6/5/84

Sample Description	Oil & Grease (Freon Solubles) mg/kg
8000	1,250.
8001	3,880.
8002	3,610.
8003	4,000.
8004	149.
8009	7,950.
8010	6,070.
8011	650.
8013	10,100.
8014	3,890.
8015	2,280.
8016	174.

Results on a dry weight basis

Robert N. Bucaro

Robert N. Bucaro

886530030